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(54) INTRAOCULAR LENS SYSTEM WITH INJECTABLE ACCOMMODATION MATERIAL

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- (58) Field of Classification Search
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(56) References Cited

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U.S. PATENT DOCUMENTS

	4,253,199	Α		3/1981	Banko			
	4,254,509	Α		3/1981	Tennant			
	4,608,650	Α		8/1986	Kapadia			
	4,685,922	Α		8/1987	Peyman			
	4,693,717	Α	*	9/1987	Michelson		623/6.13	
	4,790,847	Α		12/1988	Woods			
	4,842,601	Α		6/1989	Smith			
	4,872,877	Α		10/1989	Tiffany			
	4,892,543	Α		1/1990	Turley			
(Continued)								

FOREIGN PATENT DOCUMENTS

EP	0335312	4/1989
WO	WO-93/25187	12/1993
WO	WO-0061036	10/2000

OTHER PUBLICATIONS

Heys et al, "Massive increase in the stiffness of the human lens nucleus with age: the basis for presbyopia?", Mol. Vis., 10: 956-963, (Dec. 2004), (abstract only).*

(Continued)

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(57) ABSTRACT

The invention relates to a intraocular lens system having a flexible anterior lens accommodation material behind the lens. The accommodation material may comprise of one or more macromers, which, when polymerized, adjust the properties of the accommodation material. The anterior lens is flexible such that the curvature of the lens changes during accommodation. The anterior lens may be used alone or in combination with a posterior lens.

19 Claims, 3 Drawing Sheets

